
SSSSSSSSSSS MMM MMM GGGGGGGGGGG RRRRRRRRRRR TTTTTTTTTTTTTTT LLL
SSSSSSSSSSS MMM MMM GGGGGGGGGGG RRRRRRRRRRR TTTTTTTTTTTTTTT LLL
SSSSSSSSSSS MMM MMM GGGGGGGGGGG RRRRRRRRRRR TTTTTTTTTTTTTTT LLL
SSS MMMMMM MMMMMM GGG RRR RRR TTT LLL
SSS MMMMMM MMMMMM GGG RRR RRR TTT LLL
SSS MMMMMM MMMMMM GGG RRR RRR TTT LLL
SSS MMM MMM MMM GGG RRR RRR TTT LLL
SSS MMM MMM MMM GGG RRR RRR TTT LLL
SSS MMM MMM MMM GGG RRR RRR TTT LLL
SSSSSSSSS MMM MMM GGG RRRRRRRRRRR TTT LLL
SSSSSSSSS MMM MMM GGG RRRRRRRRRRR TTT LLL
SSSSSSSSS MMM MMM GGG RRRRRRRRRRR TTT LLL
SSS MMM MMM GGG GGGGGGGGG RRR RRR TTT LLL
SSS MMM MMM GGG GGGGGGGGG RRR RRR TTT LLL
SSS MMM MMM GGG GGGGGGGGG RRR RRR TTT LLL
SSS MMM MMM GGG GGG RRR RRR TTT LLL
SSS MMM MMM GGG GGG RRR RRR TTT LLL
SSS MMM MMM GGG GGG RRR RRR TTT LLL
SSSSSSSSSSS MMM MMM GGGGGGGGG RRR RRR TTT LLLLLLLLLLLLLLL
SSSSSSSSSSS MMM MMM GGGGGGGGG RRR RRR TTT LLLLLLLLLLLLLLL
SSSSSSSSSSS MMM MMM GGGGGGGGG RRR RRR TTT LLLLLLLLLLLLLLL

FILEID**SMGDISDRW

```
  SSSSSSSS  MM      MM   GGGGGGGG  DDDDDDDD     IIIIII     SSSSSSSS  DDDDDDDD    RRRRRRRR    WW      WW
  SSSSSSSS  MM      MM   GGGGGGGG  DDDDDDDD     IIIIII     SSSSSSSS  DDDDDDDD    RRRRRRRR    WW      WW
SS          MMMM  MMMM  GG        DD      DD     II     SS          DD      DD  RR      RR  WW      WW
SS          MMMM  MMMM  GG        DD      DD     II     SS          DD      DD  RR      RR  WW      WW
SS          MM MM MM MM  GG        DD      DD     II     SS          DD      DD  RR      RR  WW      WW
SS          MM  MM  MM  GG        DD      DD     II     SS          DD      DD  RR      RR  WW      WW
  SSSSSS    MM      MM  GG        DD      DD     II       SSSSSS    DD      DD  RRRRRRRR    WW      WW
  SSSSSS    MM      MM  GG        DD      DD     II       SSSSSS    DD      DD  RRRRRRRR    WW      WW
        SS  MM      MM  GG  GGGGG DD      DD     II             SS  DD      DD  RR  RR      WW  WW  WW
        SS  MM      MM  GG  GGGGG DD      DD     II             SS  DD      DD  RR  RR      WW  WW  WW
        SS  MM      MM  GG     GG DD      DD     II             SS  DD      DD  RR    RR    WWWW  WWWW      ....
        SS  MM      MM  GG     GG DD      DD     II             SS  DD      DD  RR    RR    WWWW  WWWW      ....
SSSSSSSS    MM      MM    GGGGGG  DDDDDDDD     IIIIII     SSSSSSSS  DDDDDDDD    RR      RR  WW      WW      ....
SSSSSSSS    MM      MM    GGGGGG  DDDDDDDD     IIIIII     SSSSSSSS  DDDDDDDD    RR      RR  WW      WW      ....


LL              IIIIII      SSSSSSSS
LL              IIIIII      SSSSSSSS
LL                II      SS
LL                II      SS
LL                II      SS
LL                II      SS
LL                II        SSSSSS
LL                II        SSSSSS
LL                II              SS
LL                II              SS
LL                II              SS
LL                II              SS
LLLLLLLLLL      IIIIII    SSSSSSSS
LLLLLLLLLL      IIIIII    SSSSSSSS
```

```
;     1          0001  0 MODULE SMG$DISPLAY_DRAW ( %TITLE 'Display line drawing'
;     2          0002  0                      IDENT = '1-004'          ! File: SMGDISDRW.B32 Edit: PLL1004
;     3          0003  0                      ) =
;     4          0004  1 BEGIN
;     5          0005  1 !
;     6          0006  1 !******************************************************************************
;     7          0007  1 !*                                                                            *
;     8          0008  1 !*  COPYRIGHT (c) 1984 BY                                                     *
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;    24          0024  1 !*  SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DIGITAL.                    *
;    25          0025  1 !*                                                                            *
;    26          0026  1 !*                                                                            *
;    27          0027  1 !******************************************************************************
;    28          0028  1 !
;    29          0029  1
;    30          0030  1 !++
;    31          0031  1 ! FACILITY:     Screen Management
;    32          0032  1 !
;    33          0033  1 ! ABSTRACT:
;    34          0034  1 !
;    35          0035  1 !       This module contains routines that draw lines in a virtual display
;    36          0036  1 !       using the line drawing character set.
;    37          0037  1 !
;    38          0038  1 ! ENVIRONMENT:  User mode - AST reentrant
;    39          0039  1 !
;    40          0040  1 ! AUTHOR: P. Levesque, CREATION DATE: 21-Sep-1983
;    41          0041  1 !
;    42          0042  1 ! MODIFIED BY:
;    43          0043  1 !
;    44          0044  1 ! 1-001 - Original.  PLL 21-Sep-1983
;    45          0045  1 ! 1-002 - Fix to $INSERT_LINE_CHAR to set proper rendition when ORing
;    46          0046  1 !         line drawing characters.  PLL 13-Apr-1984
;    47          0047  1 ! 1-003 - Fix bug preventing drawing of one character lines. STAN 3-Jun-1984.
;    48          0048  1 ! 1-004 - Don't pass SMG$C_PUT_CHARS as the function code to check_for_output_db
;    49          0049  1 !         - this makes output believe the change is confined to 1 line.  PLL 6-Sep-1984
;    50          0050  1 !--
```

```
;    52          0051  1 %SBTTL 'Declarations'
;    53          0052  1 !
;    54          0053  1 ! SWITCHES:
;    55          0054  1 !
;    56          0055  1
;    57          0056  1 REQUIRE 'RTLIN:SMGPROLOG';
;    58          0134  1
;    59          0135  1 REQUIRE 'RTLIN:STRLNK';          ! JSB linkage for string routines
;    60          0320  1 !
;    61          0321  1 ! LINKAGES:
;    62          0322  1 !
;    63          0323  1 !       NONE
;    64          0324  1 !
;    65          0325  1 ! TABLE OF CONTENTS:
;    66          0326  1 !
;    67          0327  1
;    68          0328  1 FORWARD ROUTINE
;    69          0329  1         SMG$DRAW_LINE,
;    70          0330  1         SMG$DRAW_RECTANGLE;
;    71          0331  1
;    72          0332  1 !
;    73          0333  1 ! INCLUDE FILES:
;    74          0334  1 !
;    75          0335  1
;    76          0336  1
;    77          0337  1 !
;    78          0338  1 ! MACROS:
;    79          0339  1 !
;    80          0340  1 !+
;    81          0341  1 ! The following macro inserts a line drawing character into the text
;    82          0342  1 ! buffer and checks to see if the previous character was a line drawing
;    83          0343  1 ! character.  If it was, it ORs in the new character so that intersecting
;    84          0344  1 ! lines will appear correctly on the screen.  Notice that although border
;    85          0345  1 ! elements are line drawing characters, we ignore those here - we only want
;    86          0346  1 ! proper intersections with other lines the user drew.
;    87          0347  1 !-
;    88          0348  1     MACRO
;    89        M 0349  1         $INSERT_LINE_CHAR (CHAR) =
;    90        M 0350  1         BEGIN
;    91        M 0351  1         IF .(ATTR_BUF [.POS])<ATTR_V_USER_GRAPHIC, 1>
;    92        M 0352  1         THEN
;    93        M 0353  1             BEGIN
;    94        M 0354  1             TEXT_BUF [.POS] = .TEXT_BUF [.POS] OR CHAR;
;    95        M 0355  1             ATTR_BUF [.POS] = .ATTR_BUF [.POS] AND
;    96        M 0356  1                 (NOT (SMG$M_BLINK+SMG$M_BOLD+SMG$M_REVERSE+SMG$M_UNDERLINE))
;    97        M 0357  1                 OR .REND_CODE;
;    98        M 0358  1             END
;    99        M 0359  1         ELSE
;   100        M 0360  1             BEGIN
;   101        M 0361  1             TEXT_BUF [.POS] = CHAR;
;   102        M 0362  1             ATTR_BUF [.POS] = ATTR_M_USER_GRAPHIC OR .REND_CODE;
;   103        M 0363  1             END;
;   104        M 0364  1         END%;
;   105        M 0365  1
;   106        M 0366  1 !+
;   107        M 0367  1 ! This macro resets a line to single wide/high.  The line must be
;   108        M 0368  1 ! blanked first.
```

```
;  109          0369  1 !-
;  110          0370  1     MACRO
;  111        M 0371  1         $RESET_LINE  (LINE_NO) =
;  112        M 0372  1         BEGIN                       ! reset/blank line
;  113        M 0373  1         LOCAL
;  114        M 0374  1             START_INDEX;
;  115        M 0375  1         START_INDEX = $SMG$LINEAR (LINE_NO, .DCB [DCB_W_COL_START]);
;  116        M 0376  1         $SMG$BLANK_FILL_DCB (.DCB [DCB_W_NO_COLS], .START_INDEX);
;  117        M 0377  1         LINE_CHAR [LINE_NO] = 0,
;  118        M 0378  1         END%;                       ! reset/blank line
;  119          0379  1
;  120          0380  1 !
;  121          0381  1 ! EQUATED SYMBOLS:
;  122          0382  1 !
;  123          0383  1 !       NONE
;  124          0384  1 !
;  125          0385  1 ! FIELDS:
;  126          0386  1 !
;  127          0387  1 !       NONE
;  128          0388  1 !
;  129          0389  1 ! PSECTS:
;  130          0390  1 !
;  131          0391  1
;  132          0392  1 !
;  133          0393  1 ! OWN STORAGE:
;  134          0394  1 !
;  135          0395  1 !       NONE
;  136          0396  1 !
;  137          0397  1 ! EXTERNAL REFERENCES:
;  138          0398  1 !
;  139          0399  1
;  140          0400  1 EXTERNAL ROUTINE
;  141          0401  1         SMG$$CHECK_FOR_OUTPUT_DCB;      ! check if time to repaint display
;  142          0402  1
;  143          0403  1 EXTERNAL LITERAL
;  144          0404  1         SMG$_INVDIS_ID,                 ! Invalid display id
;  145          0405  1         SMG$_INVARG,                    ! Invalid argument
;  146          0406  1         SMG$_INVCOL,                    ! Invalid column number
;  147          0407  1         SMG$_INVROW,                    ! Invalid row number
;  148          0408  1         SMG$_DIALINNOT,                 ! Diagonal line not allowed
;  149          0409  1         SMG$_WRONUMARG;                 ! Wrong number of arguments
```

```
;  151     0410  1 %SBTTL 'SMG$DRAW_LINE - Draw a line in a virtual display'
;  152     0411  1 GLOBAL ROUTINE SMG$DRAW_LINE (
;  153     0412  1                                 DISPLAY_ID,
;  154     0413  1                                 START_ROW,
;  155     0414  1                                 START_COL,
;  156     0415  1                                 END_ROW,
;  157     0416  1                                 END_COL,
;  158     0417  1                                 RENDITION_SET,
;  159     0418  1                                 RENDITION_COMPLEMENT
;  160     0419  1     ) =
;  161     0420  1
;  162     0421  1 !++
;  163     0422  1 ! FUNCTIONAL DESCRIPTION:
;  164     0423  1 !
;  165     0424  1 !       This routine draws a line from START_ROW, START_COL to END_ROW, END_COL.
;  166     0425  1 !       Device independent codes are moved to the display text and
;  167     0426  1 !       attributes buffers - output later figures out what characters
;  168     0427  1 !       to use based on the type of terminal.
;  169     0428  1 !
;  170     0429  1 !       The internal cursor position is not changed.
;  171     0430  1 !
;  172     0431  1 ! CALLING SEQUENCE:
;  173     0432  1 !
;  174     0433  1 !       ret_status.wlc.v  =   SMG$DRAW_LINE   (DISPLAY_ID.rl.r,
;  175     0434  1 !                                              START_ROW.rl.r, START_COL.rl.r,
;  176     0435  1 !                                              END_ROW.rl.r, END_COL.rl.r
;  177     0436  1 !                                              [,RENDITION_SET.r[.r]
;  178     0437  1 !                                              [,RENDITION_COMPLEMENT.rl.r])
;  179     0438  1 !
;  180     0439  1 ! FORMAL PARAMETERS:
;  181     0440  1 !
;  182     0441  1 !       DISPLAY_ID.rl.r         Display id of virtual display
;  183     0442  1 !
;  184     0443  1 !       START_ROW.rl.r          Address of row number at which
;  185     0444  1 !                               to start line.
;  186     0445  1 !
;  187     0446  1 !       START_COL.rl.r          Address of column number at which
;  188     0447  1 !                               to start line.
;  189     0448  1 !
;  190     0449  1 !       END_ROW.rl.r            Address of row number at which
;  191     0450  1 !                               to end line.
;  192     0451  1 !
;  193     0452  1 !       END_COL.rl.r            Address of column number at which
;  194     0453  1 !                               to end line.
;  195     0454  1 !
;  196     0455  1 !       RENDITION_SET.rl.r      Optional.  Each 1 bit in this parameter
;  197     0456  1 !                               causes the corresponding attribute to be
;  198     0457  1 !                               set in the display.  (See below for list
;  199     0458  1 !                               of settable attributes.)
;  200     0459  1 !
;  201     0460  1 !       RENDITION_COMPLEMENT.rl.r Optional.  Each 1 bit attribute in this
;  202     0461  1 !                                  parameter causes the corresponding attribute
;  203     0462  1 !                                  to be complemented in the display.  (See
;  204     0463  1 !                                  below for list of complementable attributes.)
;  205     0464  1 !
;  206     0465  1 !       If the same bit is specified in both the RENDITION_SET parameter
;  207     0466  1 !       and in the RENDITION_COMPLEMENT parameter, the application is
```

```
;  208     0467  1 !       RENDITION_SET followed by RENDITION complement.  Using these two
;  209     0468  1 !       parameters together the caller can exercise arbitrary and
;  210     0469  1 !       independent control over each attribute on a single call.  On an
;  211     0470  1 !       attribute by attribute basis he can cause the following
;  212     0471  1 !       transformations:
;  213     0472  1 !
;  214     0473  1 !               SET     COMPLEMENT      Action
;  215     0474  1 !               ---     ----------      ------
;  216     0475  1 !               0       0               Attribute unchanged.
;  217     0476  1 !               1       0               Attribute set to "on"
;  218     0477  1 !               0       1               Attribute set to complement of
;  219     0478  1 !                                       current setting.
;  220     0479  1 !               1       1               Attribute set to "off".
;  221     0480  1 !
;  222     0481  1 !
;  223     0482  1 !       Attributes which can be manipulated in this manner are:
;  224     0483  1 !
;  225     0484  1 !       SMG$M_BLINK  displays characters blinking.
;  226     0485  1 !       SMG$M_BOLD  displays characters in higher-than-normal
;  227     0486  1 !                   intensity.
;  228     0487  1 !       SMG$M_REVERSE  displays characters in reverse video -- that is,
;  229     0488  1 !                   using the opposite default rendition of the
;  230     0489  1 !                   virtual display.
;  231     0490  1 !       SMG$M_UNDERLINE  displays characters underlined.
;  232     0491  1 !
;  233     0492  1 !
;  234     0493  1 ! IMPLICIT INPUTS:
;  235     0494  1 !
;  236     0495  1 !       NONE
;  237     0496  1 !
;  238     0497  1 ! IMPLICIT OUTPUTS:
;  239     0498  1 !
;  240     0499  1 !       NONE
;  241     0500  1 !
;  242     0501  1 ! COMPLETION STATUS:
;  243     0502  1 !
;  244     0503  1 !       SS$_NORMAL      Normal successful completion
;  245     0504  1 !       SMG$_INVCOL     Invalid column number
;  246     0505  1 !       SMG$_INVROW     Invalid row number
;  247     0506  1 !       SMG$_DIALINNOT  Diagonal line not allowed
;  248     0507  1 !       SMG$_WRONUMARG  Wrong number of arguments
;  249     0508  1 !
;  250     0509  1 ! SIDE EFFECTS:
;  251     0510  1 !
;  252     0511  1 !       NONE
;  253     0512  1 !
;  254     0513  1 !--
;  255     0514  1
;  256     0515  2     BEGIN
;  257     0516  2
;  258     0517  2     LOCAL
;  259     0518  2         WORK_S_ROW,                     ! local temporaries
;  260     0519  2         WORK_S_COL,                     !   ''
;  261     0520  2         WORK_E_ROW,                     !   ''
;  262     0521  2         WORK_E_COL,                     !   ''
;  263     0522  2         TEXT_BUF : REF VECTOR [,BYTE],  ! ptr to dcb text buffer
;  264     0523  2         ATTR_BUF : REF VECTOR [,BYTE],  ! ptr to dcb attr buffer
```

```
;   265          0524  2          DIR : INITIAL (0),                  ! direction of line
;   266          0525  2          REND_CODE,                          ! rendition code to use
;   267          0526  2          DCB : REF BLOCK [,BYTE];            ! addr of display control block
;   268          0527  2
;   269          0528  2      LITERAL
;   270          0529  2          K_SET_ARG = 6,                      ! arg number of rend set
;   271          0530  2          K_COMP_ARG = 7,                     ! arg number of rend complement
;   272          0531  2          K_HORIZ = 1;                        ! line is horizontal
;   273          0532  2
;   274          0533  2
;   275          0534  2      $SMG$GET_DCB (.DISPLAY_ID, DCB);        ! get addr of virtual display
;   276          0535  2                                              ! control block
;   277          0536  2      TEXT_BUF = .DCB [DCB_A_TEXT_BUF];
;   278          0537  2      ATTR_BUF = .DCB [DCB_A_ATTR_BUF];
;   279          0538  2
;   280          0539  2  !+
;   281          0540  2  ! Validate arguments passed.  Check for optionals.
;   282          0541  2  !-
;   283          0542  2
;   284          0543  2      $SMG$VALIDATE_ARGCOUNT (5, 7);
;   285          0544  2
;   286          0545  2      $SMG$VALIDATE_ROW_COL (..START_ROW, ..START_COL);
;   287          0546  2
;   288          0547  2      $SMG$VALIDATE_ROW_COL (..END_ROW, ..END_COL);
;   289          0548  2
;   290          0549  2      $SMG$SET_REND_CODE (K_SET_ARG, K_COMP_ARG);
;   291          0550  2                                              ! macro to use caller's args if present
;   292          0551  2
;   293          0552  2  !+
;   294          0553  2  ! Use local temporary storage for start and end points.  We don't know
;   295          0554  2  ! the order in which the points will be passed, but our code assumes
;   296          0555  2  ! left to right order for horizontal lines, and up to down order for vertical
;   297          0556  2  ! lines.
;   298          0557  2  !-
;   299          0558  2
;   300          0559  2      IF ..START_ROW EQL ..END_ROW
;   301          0560  2      THEN
;   302          0561  2          DIR = K_HORIZ
;   303          0562  2      ELSE
;   304          0563  2          IF ..START_COL NEQ ..END_COL
;   305          0564  2          THEN
;   306          0565  2              RETURN (SMG$_DIALINNOT);
;   307          0566  2
;   308          0567  2      IF .DIR EQL K_HORIZ
;   309          0568  2      THEN
;   310          0569  3          BEGIN
;   311          0570  3          IF ..START_COL LSS ..END_COL
;   312          0571  3          THEN
;   313          0572  4              BEGIN
;   314          0573  4              WORK_S_COL = ..START_COL;
;   315          0574  4              WORK_S_ROW = ..START_ROW;
;   316          0575  4              WORK_E_COL = ..END_COL;
;   317          0576  4              WORK_E_ROW = ..END_ROW;
;   318          0577  4              END
;   319          0578  3          ELSE
;   320          0579  4              BEGIN
;   321          0580  4              WORK_S_COL = ..END_COL;
```

```
;  322     0581  4                 WORK_S_ROW = ..END_ROW;
;  323     0582  4                 WORK_E_COL = ..START_COL;
;  324     0583  4                 WORK_E_ROW = ..START_ROW;
;  325     0584  3                 END;
;  326     0585  3             END
;  327     0586  2         ELSE                                    ! vertical line
;  328     0587  2             IF ..START_ROW LSS ..END_ROW
;  329     0588  2             THEN
;  330     0589  3                 BEGIN
;  331     0590  3                 WORK_S_COL = ..START_COL;
;  332     0591  3                 WORK_S_ROW = ..START_ROW;
;  333     0592  3                 WORK_E_COL = ..END_COL;
;  334     0593  3                 WORK_E_ROW = ..END_ROW;
;  335     0594  3                 END
;  336     0595  2             ELSE
;  337     0596  3                 BEGIN
;  338     0597  3                 WORK_S_COL = ..END_COL;
;  339     0598  3                 WORK_S_ROW = ..END_ROW;
;  340     0599  3                 WORK_E_COL = ..START_COL;
;  341     0600  3                 WORK_E_ROW = ..START_ROW;
;  342     0601  3                 END;
;  343     0602  2
;  344     0603  2 !+
;  345     0604  2 ! Reset the line characteristics vector in case there was previously
;  346     0605  2 ! some double high or double wide text.
;  347     0606  2 !
;  348     0607  2 ! We may be dealing with a vertical or horizontal line.  A vertical line
;  349     0608  2 ! will require re-setting multiple entries in the vector.
;  350     0609  2 !-
;  351     0610  2
;  352     0611  3     BEGIN
;  353     0612  3     BIND
;  354     0613  3         LINE_CHAR = .DCB [DCB_A_LINE_CHAR];
;  355     0614  3     MAP
;  356     0615  3         LINE_CHAR : VECTOR [,BYTE];
;  357     0616  3
;  358     0617  3     IF .DIR EQL K_HORIZ                     ! horiz line - reset 1 ele of vector
;  359     0618  3     THEN
;  360     0619  4         BEGIN
;  361     0620  4         IF .LINE_CHAR [.WORK_S_ROW] NEQ 0
;  362     0621  4         THEN
;  363     0622  4             $RESET_LINE (.WORK_S_ROW);
;  364     0623  4         END
;  365     0624  3     ELSE
;  366     0625  4         BEGIN                               ! vert line - reset multi elements
;  367     0626  4         INCR ROW FROM .WORK_S_ROW TO .WORK_E_ROW DO
;  368     0627  5             BEGIN
;  369     0628  5             IF .LINE_CHAR [.ROW] NEQ 0
;  370     0629  5             THEN
;  371     0630  5                 $RESET_LINE (.ROW);
;  372     0631  4             END;
;  373     0632  3         END;
;  374     0633  3
;  375     0634  2     END;
;  376     0635  2
;  377     0636  2 !+
;  378     0637  2 ! Insert the generic text byte for line drawing into the text buffer.
```

```
;  379          0638  2 ! (Notice that there are different representations for horizontal, vertical,
;  380          0639  2 ! corners, etc.)  Set a bit in the attribute byte so the output routines
;  381          0640  2 ! will re-interpret the generic text into the device specific character.
;  382          0641  2 !
;  383          0642  2 ! We move one character at a time since it may be necessary to OR elements
;  384          0643  2 ! (see description of macro above).
;  385          0644  2 !-
;  386          0645  2
;  387          0646  3     BEGIN
;  388          0647  3     LOCAL
;  389          0648  3         POS,                                ! linear index into text buffer
;  390          0649  3         LENGTH;                             ! calc length of line
;  391          0650  3
;  392          0651  3     POS = $SMG$LINEAR (.WORK_S_ROW, .WORK_S_COL);
;  393          0652  3
;  394          0653  3     IF .DIR EQL K_HORIZ                     ! horizontal line
;  395          0654  3     THEN
;  396          0655  4         BEGIN
;  397          0656  4         LENGTH = .WORK_E_COL - .WORK_S_COL + 1;
;  398          0657  4
;  399          0658  4         $INSERT_LINE_CHAR (BORD_M_RIGHT);
;  400          0659  4         POS = .POS + 1;
;  401          0660  4
;  402          0661  4         INCR NUM_CHAR FROM 2 TO (.LENGTH - 1) DO
;  403          0662  5             BEGIN
;  404          0663  5             $INSERT_LINE_CHAR (BORD_M_HORIZ);
;  405          0664  5             POS = .POS + 1;
;  406          0665  4             END;
;  407          0666  4
;  408          0667  4         IF .LENGTH GTR 1
;  409          0668  4         THEN
;  410          0669  4             $INSERT_LINE_CHAR (BORD_M_LEFT);
;  411          0670  4
;  412          0671  4         END
;  413          0672  3     ELSE
;  414          0673  4         BEGIN                               ! vertical line
;  415          0674  4         LENGTH = .WORK_E_ROW - .WORK_S_ROW + 1;
;  416          0675  4
;  417          0676  4         $INSERT_LINE_CHAR (BORD_M_DOWN);
;  418          0677  4         POS = .POS + .DCB [DCB_W_NO_COLS];
;  419          0678  4
;  420          0679  4         INCR ROW FROM 2 TO (.LENGTH - 1) DO
;  421          0680  5             BEGIN
;  422          0681  5             $INSERT_LINE_CHAR (BORD_M_VERT);
;  423          0682  5             POS = .POS + .DCB [DCB_W_NO_COLS];
;  424          0683  4             END;
;  425          0684  4
;  426          0685  4         IF .LENGTH GTR 1
;  427          0686  4         THEN
;  428          0687  4             $INSERT_LINE_CHAR (BORD_M_UP);
;  429          0688  4
;  430          0689  3         END;
;  431          0690  3
;  432          0691  2     END;
;  433          0692  2
;  434          0693  2 !+
;  435          0694  2 ! See if this change should be reflected on the screen immediately.
```

```
;  436          0695  2 !-
;  437          0696  2
;  438          0697  2     RETURN (SMG$$CHECK_FOR_OUTPUT_DCB (.DCB,
;  439          0698  2                                        0,
;  440          0699  2                                        .WORK_S_ROW));
;  441          0700  2
;  442          0701  2
;  443          0702  1     END;                                ! End of routine SMG$DRAW_LINE


                                                               .TITLE  SMG$DISPLAY_DRAW Display line drawing
                                                               .IDENT  \1-004\

                                                               .EXTRN  SMG$$CHECK_FOR_OUTPUT_DCB
                                                               .EXTRN  SMG$_INVDIS_ID, SMG$_INVARG
                                                               .EXTRN  SMG$_INVCOL, SMG$_INVROW
                                                               .EXTRN  SMG$_DIALINNOT, SMG$_WRONUMARG

                                                               .PSECT  _SMG$CODE,NOWRT,  SHR,  PIC,2

                                        OFFC 00000             .ENTRY  SMG$DRAW_LINE, Save R2,R3,R4,R5,R6,R7,R8,-  ; 0411
                                                                       R9,R10,R11
                                    5E          20  C2 00002        SUBL2   #32, SP                                 ;
                                                54  D4 00005        CLRL    DIR                                     ; 0515
                                    50      04  BC  D0 00007        MOVL    @DISPLAY_ID, R0                         ; 0534
                                04  BC      38  A0  D1 0000B        CMPL    56(R0), @DISPLAY_ID                     ;
                                                06  12 00010        BNEQ    1$                                      ;
                                    11      44  A0  91 00012        CMPB    68(R0), #17                             ;
                                                08  13 00016        BEQL    2$                                      ;
                                    50 00000000G    8F  D0 00018 1$:    MOVL    #SMG$_INVDIS_ID, R0                 ;
                                                    04  0001F        RET                                             ;
                                    5B      04  BC  D0 00020 2$:    MOVL    @DISPLAY_ID, DCB                        ;
                                04  AE      10  AB  D0 00024        MOVL    16(DCB), TEXT_BUF                       ; 0536
                                    5A      14  AB  D0 00029        MOVL    20(DCB), ATTR_BUF                       ; 0537
                            50      6C          05  83 0002D        SUBB3   #5, (AP), DIFF                          ; 0543
                                    02          50  91 00031        CMPB    DIFF, #2                                ;
                                                08  1B 00034        BLEQU   3$                                      ;
                                    50 00000000G    8F  D0 00036        MOVL    #SMG$_WRONUMARG, R0                 ;
                                                    04  0003D        RET                                             ;
                                    53      08  BC  D0 0003E 3$:    MOVL    @START_ROW, R3                          ; 0545
                                                08  15 00042        BLEQ    4$                                      ;
                        53      02  AB          10  00  ED 00044        CMPZV   #0, #16, 2(DCB), R3                 ;
                                                    08  18 0004A        BGEQ    5$                                  ;
                                    50 00000000G    8F  D0 0004C 4$:    MOVL    #SMG$_INVROW, R0                    ;
                                                    04  00053        RET                                             ;
                                    52      0C  BC  D0 00054 5$:    MOVL    @START_COL, R2                          ;
                                                08  15 00058        BLEQ    6$                                      ;
                        52      06  AB          10  00  ED 0005A        CMPZV   #0, #16, 6(DCB), R2                 ;
                                                    08  18 00060        BGEQ    7$                                  ;
                                    50 00000000G    8F  D0 00062 6$:    MOVL    #SMG$_INVCOL, R0                    ;
                                                    04  00069        RET                                             ;
                                    51      10  BC  D0 0006A 7$:    MOVL    @END_ROW, R1                            ; 0547
                                                08  15 0006E        BLEQ    8$                                      ;
                        51      02  AB          10  00  ED 00070        CMPZV   #0, #16, 2(DCB), R1                 ;
                                                    08  18 00076        BGEQ    9$                                  ;
                                    50 00000000G    8F  D0 00078 8$:    MOVL    #SMG$_INVROW, R0                    ;
                                                    04  0007F        RET                                             ;
```

```
                                     50        14   BC  D0 00080 9$:      MOVL    @END_COL, R0                          ;
                                                    08  15 00084          BLEQ    10$                                   ;
         50        06   AB                 10       00  ED 00086          CMPZV   #0, #16, 6(DCB), R0                   ;
                                                    08  18 0008C          BGEQ    11$                                   ;
                                     50 00000000G   8F  D0 0008E 10$:     MOVL    #SMG$_INVCOL, R0                      ;
                                                        04 00095          RET                                           ;
                              10     AE        2E   AB  9A 00096 11$:     MOVZBL  46(DCB), REND_CODE                    ; 0549
                                     06             6C  91 0009B          CMPB    (AP), #6                              ;
                                                    0A  1F 0009E          BLSSU   12$                                   ;
                                               18   AC  D5 000A0          TSTL    24(AP)                                ;
                                                    05  13 000A3          BEQL    12$                                   ;
                              10     AE        18   BC  C8 000A5          BISL2   @RENDITION_SET, REND_CODE             ;
                                     07             6C  91 000AA 12$:     CMPB    (AP), #7                              ;
                                                    0A  1F 000AD          BLSSU   13$                                   ;
                                               1C   AC  D5 000AF          TSTL    28(AP)                                ;
                                                    05  13 000B2          BEQL    13$                                   ;
                              10     AE        1C   BC  CC 000B4          XORL2   @RENDITION_COMPLEMENT, REND_CODE      ;
                                     51             53  D1 000B9 13$:     CMPL    R3, R1                                ; 0559
                                                    05  12 000BC          BNEQ    14$                                   ;
                                     54             01  D0 000BE          MOVL    #1, DIR                               ; 0561
                                                    0D  11 000C1          BRB     15$                                   ;
                                     50             52  D1 000C3 14$:     CMPL    R2, R0                                ; 0563
                                                    08  13 000C6          BEQL    15$                                   ;
                                     50 00000000G   8F  D0 000C8          MOVL    #SMG$_DIALINNOT, R0                   ; 0565
                                                        04 000CF          RET                                           ;
                                               1C   AE  D4 000D0 15$:     CLRL    28(SP)                                ; 0567
                                     01             54  D1 000D3          CMPL    DIR, #1                               ;
                                                    08  12 000D6          BNEQ    16$                                   ;
                                               1C   AE  D6 000D8          INCL    28(SP)                                ;
                                     50             52  D1 000DB          CMPL    R2, R0                                ; 0570
                                                    03  11 000DE          BRB     17$                                   ;
                                     51             53  D1 000E0 16$:     CMPL    R3, R1                                ; 0587
                                                    0F  18 000E3 17$:     BGEQ    18$                                   ;
                              14     AE             52  D0 000E5          MOVL    R2, WORK_S_COL                        ; 0590
                                     57             53  D0 000E9          MOVL    R3, WORK_S_ROW                        ; 0591
                                     59             50  D0 000EC          MOVL    R0, WORK_E_COL                        ; 0592
                                     58             51  D0 000EF          MOVL    R1, WORK_E_ROW                        ; 0593
                                                    0D  11 000F2          BRB     19$                                   ; 0587
                              14     AE             50  D0 000F4 18$:     MOVL    R0, WORK_S_COL                        ; 0597
                                     57             51  D0 000F8          MOVL    R1, WORK_S_ROW                        ; 0598
                                     59             52  D0 000FB          MOVL    R2, WORK_E_COL                        ; 0599
                                     58             53  D0 000FE          MOVL    R3, WORK_E_ROW                        ; 0600
                                     54        1C   AE  E9 00101 19$:     BLBC    28(SP), 22$                           ; 0620
                                             4C BB47    95 00105          TSTB    @76(DCB)[WORK_S_ROW]                  ;
                                                    4C  13 00109          BEQL    21$                                   ;
                                     56        FF   A7  9E 0010B          MOVAB   -1(R7), R6                            ; 0622
                                     50        06   AB  3C 0010F          MOVZWL  6(DCB), R0                            ;
                                     56             50  C4 00113          MULL2   R0, R6                                ;
                                     50        04   AB  3C 00116          MOVZWL  4(DCB), R0                            ;
                              18     AE      FF A046    9E 0011A          MOVAB   -1(R0)[R6], START_INDEX               ;
                                     50        10   AB  D0 00120          MOVL    16(DCB), TEXT_BUF                     ;
                                     56        14   AB  D0 00124          MOVL    20(DCB), ATTR_BUF                     ;
                              0C     AE        18   AB  D0 00128          MOVL    24(DCB), CHAR_BUF                     ;
    06   AB                 20       6E             00  2C 0012D          MOVC5   #0, (SP), #32, 6(DCB), @START_INDEX-  ;
                                             18 BE40       00133                  [TEXT_BUF]                            ;
    06   AB        2E       AB       6E             00  2C 00136          MOVC5   #0, (SP), 46(DCB), 6(DCB), @START_INDEX-  ;
                                             18 BE46       0013D                  [ATTR_BUF]                            ;
```

```
                                    0C    AE  D5 00140        TSTL    CHAR_BUF                                  ;
                                    0E    13  00143           BEQL    20$                                       ;
                          56        0C    AE  D0 00145        MOVL    CHAR_BUF, R6                              ;
   06   AB    30    AB              6E    00  2C 00149        MOVC5   #0, (SP), 48(DCB), 6(DCB), @START_INDEX[R6] ;
                               18 BE46        00150                                                             ;
                               4C BB47    94  00153 20$:      CLRB    @76(DCB)[WORK_S_ROW]                      ;
                                    5F    11  00157 21$:      BRB     26$                                       ; 0617
                          56    FF   A7   9E  00159 22$:      MOVAB   -1(R7), ROW                               ; 0626
                                    55    11  0015D           BRB     25$                                       ;
                               4C BB46    95  0015F 23$:      TSTB    @76(DCB)[ROW]                             ; 0628
                                    4F    13  00163           BEQL    25$                                       ;
                          50    FF   A6   9E  00165           MOVAB   -1(R6), R0                                ; 0630
                          51    06   AB   3C  00169           MOVZWL  6(DCB), R1                                ;
                          50         51   C4  0016D           MULL2   R1, R0                                    ;
                          51    04   AB   3C  00170           MOVZWL  4(DCB), R1                                ;
                    18    AE    FF A140   9E  00174           MOVAB   -1(R1)[R0], START_INDEX                   ;
                          50    10   AB   D0  0017A           MOVL    16(DCB), TEXT_BUF                         ;
                    08    AE    14   AB   7D  0017E           MOVQ    20(DCB), ATTR_BUF                         ;
   06   AB          20    6E         00   2C  00183           MOVC5   #0, (SP), #32, 6(DCB), @START_INDEX-      ;
                               18 BE40        00189                   [TEXT_BUF]                                ;
              6E    18    AE    08   AE   C1  0018C           ADDL3   ATTR_BUF, START_INDEX, (SP)               ;
   06    B    2E    AB    6E         00   2C  00192           MOVC5   #0, (SP), 46(DCB), 6(DCB), @0(SP)         ;
                                00   BE       00199                                                             ;
                                0C   AE   D5  0019B           TSTL    CHAR_BUF                                  ;
                                     10   13  0019E           BEQL    24$                                       ;
        08    AE    18    AE    0C   AE   C1  001A0           ADDL3   CHAR_BUF, START_INDEX, 8(SP)              ;
   06   AB    30    AB    6E         00   2C  001A7           MOVC5   #0, (SP), 48(DCB), 6(DCB), @8(SP)         ;
                                08   BE       001AE                                                             ;
                               4C BB46    94  001B0 24$:      CLRB    @76(DCB)[ROW]                             ;
              A7          56         58   F3  001B4 25$:      AOBLEQ  WORK_E_ROW, ROW, 23$                      ; 0626
                          56    FF   A7   9E  001B8 26$:      MOVAB   -1(R7), R6                                ; 0651
                          50    06   AB   3C  001BC           MOVZWL  6(DCB), R0                                ;
                          56         50   C4  001C0           MULL2   R0, R6                                    ;
              51    14    AE         01   C3  001C3           SUBL3   #1, WORK_S_COL, R1                        ;
              50          56         51   C1  001C8           ADDL3   R1, R6, POS                               ;
              52          5A         50   C1  001CC           ADDL3   POS, ATTR_BUF, R2                         ; 0658
              53          50    04   AE   C1  001D0           ADDL3   TEXT_BUF, POS, R3                         ;
                          03    1C   AE   E8  001D5           BLBS    28(SP), 27$                               ;
                               008A       31  001D9           BRW     36$                                       ;
                          59    14   AE   C2  001DC 27$:      SUBL2   WORK_S_COL, R9                            ; 0656
                          51    01   A9   9E  001E0           MOVAB   1(R9), LENGTH                             ;
              10          62         06   E1  001E4           BBC     #6, (R2), 28$                             ; 0658
                          63         01   88  001E8           BISB2   #1, (R3)                                  ;
                          53         62   9A  001EB           MOVZBL  (R2), R3                                  ;
                          53         0F   CA  001EE           BICL2   #15, R3                                   ;
              62          53    10   AE   89  001F1           BISB3   REND_CODE, R3, (R2)                       ;
                                     09   11  001F6           BRB     29$                                       ;
                          63         01   90  001F8 28$:      MOVB    #1, (R3)                                  ;
              62    10    AE    40   8F   89  001FB           BISB3   #64, REND_CODE, (R2)                      ;
                                     50   D6  00201 29$:      INCL    POS                                       ; 0659
                          53         01   D0  00203           MOVL    #1, NUM_CHAR                              ; 0661
                                     2D   11  00206           BRB     33$                                       ;
              17        604A         06   E1  00208 30$:      BBC     #6, (POS)[ATTR_BUF], 31$                  ; 0663
                          52    04   AE   D0  0020D           MOVL    TEXT_BUF, R2                              ;
                        6042         05   88  00211           BISB2   #5, (POS)[R2]                             ;
                          52       604A   9A  00215           MOVZBL  (POS)[ATTR_BUF], R2                       ;
                          52         0F   CA  00219           BICL2   #15, R2                                   ;
```

```
      604A      52      10   AE  89 0021C        BISB3   REND_CODE, R2, (POS)[ATTR_BUF]          ;
                             0F  11 00222        BRB     32$                                     ;
                52      04   AE  D0 00224 31$:   MOVL    TEXT_BUF, R2                            ;
              6042           05  90 00228        MOVB    #5, (POS)[R2]                           ;
      604A  10  AE      40   8F  89 0022C        BISB3   #64, REND_CODE, (POS)[ATTR_BUF]         ;
                             50  D6 00233 32$:   INCL    POS                                     ; 0664
        CF      53           51  F2 00235 33$:   AOBLSS  LENGTH, NUM_CHAR, 30$                   ; 0661
                01           51  D1 00239        CMPL    LENGTH, #1                              ; 0667
                             1A  15 0023C        BLEQ    34$                                     ;
        18    604A           06  E1 0023E        BBC     #6, (POS)[ATTR_BUF], 35$                ; 0669
                51      04   AE  D0 00243        MOVL    TEXT_BUF, R1                            ;
              6041           04  88 00247        BISB2   #4, (POS)[R1]                           ;
                52         604A  9A 0024B        MOVZBL  (POS)[ATTR_BUF], R2                     ;
                52           0F  CA 0024F        BICL2   #15, R2                                 ;
      604A      52      10   AE  89 00252        BISB3   REND_CODE, R2, (POS)[ATTR_BUF]          ;
                           00A1  31 00258 34$:   BRW     45$                                     ;
                51      04   AE  D0 0025B 35$:   MOVL    TEXT_BUF, R1                            ;
              6041           04  90 0025F        MOVB    #4, (POS)[R1]                           ;
                           008F  31 00263        BRW     44$                                     ;
                58           57  C2 00266 36$:   SUBL2   WORK_S_ROW, R8                          ; 0674
                51      01   A8  9E 00269        MOVAB   1(R8), LENGTH                           ;
        10      62           06  E1 0026D        BBC     #6, (R2), 37$                           ; 0676
                63           08  88 00271        BISB2   #8, (R3)                                ;
                53           62  9A 00274        MOVZBL  (R2), R3                                ;
                53           0F  CA 00277        BICL2   #15, R3                                 ;
        62      53      10   AE  89 0027A        BISB3   REND_CODE, R3, (R2)                     ;
                             09  11 0027F        BRB     38$                                     ;
                63           08  90 00281 37$:   MOVB    #8, (R3)                                ;
        62  10  AE      40   8F  89 00284        BISB3   #64, REND_CODE, (R2)                    ;
                52      06   AB  3C 0028A 38$:   MOVZWL  6(DCB), R2                              ; 0677
                50           52  C0 0028E        ADDL2   R2, POS                                 ;
                53           01  D0 00291        MOVL    #1, ROW                                 ; 0679
                             32  11 00294        BRB     42$                                     ;
        17    604A           06  E1 00296 39$:   BBC     #6, (POS)[ATTR_BUF], 40$                ; 0681
                52      04   AE  D0 0029B        MOVL    TEXT_BUF, R2                            ;
              6042           0A  88 0029F        BISB2   #10, (POS)[R2]                          ;
                52         604A  9A 002A3        MOVZBL  (POS)[ATTR_BUF], R2                     ;
                52           0F  CA 002A7        BICL2   #15, R2                                 ;
      604A      52      10   AE  89 002AA        BISB3   REND_CODE, R2, (POS)[ATTR_BUF]          ;
                             0F  11 002B0        BRB     41$                                     ;
                52      04   AE  D0 002B2 40$:   MOVL    TEXT_BUF, R2                            ;
              6042           0A  90 002B6        MOVB    #10, (POS)[R2]                          ;
      604A  10  AE      40   8F  89 002BA        BISB3   #64, REND_CODE, (POS)[ATTR_BUF]         ;
                52      06   AB  3C 002C1 41$:   MOVZWL  6(DCB), R2                              ; 0682
                50           52  C0 002C5        ADDL2   R2, POS                                 ;
        CA      53           51  F2 002C8 42$:   AOBLSS  LENGTH, ROW, 39$                        ; 0679
                01           51  D1 002CC        CMPL    LENGTH, #1                              ; 0685
                             2B  15 002CF        BLEQ    45$                                     ;
        17    604A           06  E1 002D1        BBC     #6, (FOS)[ATTR_BUF], 43$                ; 0687
                51      04   AE  D0 002D6        MOVL    TEXT_BUF, R1                            ;
              6041           02  88 002DA        BISB2   #2, (POS)[R1]                           ;
                51         604A  9A 002DE        MOVZBL  (POS)[ATTR_BUF], R1                     ;
                51           0F  CA 002E2        BICL2   #15, R1                                 ;
      604A      51      10   AE  89 002E5        BISB3   REND_CODE, R1, (POS)[ATTR_BUF]          ;
                             0F  11 002EB        BRB     45$                                     ;
                51      04   AE  D0 002ED 43$:   MOVL    TEXT_BUF, R1                            ;
              6041           02  90 002F1        MOVB    #2, (POS)[R1]                           ;
```

```
                 604A      10   AE      40   8F  89 002F5 44$:    BISB3   #64, REND_CODE, (POS)[ATTR_BUF]          ;
                                             57  DD 002FC 45$:    PUSHL   WORK_S_ROW                               ; 0699
                                             7E  D4 002FE         CLRL    -(SP)                                    ; 0697
                                             5B  DD 00300         PUSHL   DCB                                      ;
                     00000000G   00          03  FB 00302         CALLS   #3, SMG$$CHECK_FOR_OUTPUT_DCB            ;
                                                 04 00309         RET                                              ; 0702

; Routine Size:  778 bytes,    Routine Base:  _SMG$CODE + 0000
```

```
;  445     0703  1 %SBTTL 'SMG$DRAW_RECTANGLE - Draw a rectangle in a virtual display'
;  446     0704  1 GLOBAL ROUTINE SMG$DRAW_RECTANGLE   (
;  447     0705  1                                      DISPLAY_ID,
;  448     0706  1                                      TOP_LEFT_ROW,
;  449     0707  1                                      TOP_LEFT_COL,
;  450     0708  1                                      BOTTOM_RIGHT_ROW,
;  451     0709  1                                      BOTTOM_RIGHT_COL,
;  452     0710  1                                      RENDITION_SET,
;  453     0711  1                                      RENDITION_COMPLEMENT
;  454     0712  1     ) =
;  455     0713  1
;  456     0714  1 !++
;  457     0715  1 ! FUNCTIONAL DESCRIPTION:
;  458     0716  1 !
;  459     0717  1 !       This routine draws a rectangle in a virtual display.  Given
;  460     0718  1 !       two points in opposite corners of the rectangle, it determines
;  461     0719  1 !       the desired width and height.
;  462     0720  1 !
;  463     0721  1 ! Top left row, col *-----------------------
;  464     0722  1 !                    |                      |
;  465     0723  1 !                    |                      |
;  466     0724  1 !                    |                      |
;  467     0725  1 !                    |                      |
;  468     0726  1 !                    -----------------------* Bottom right row, col
;  469     0727  1 !
;  470     0728  1 !       Device independent codes are placed in the display text and
;  471     0729  1 !       attribute buffers.  Output decides which line drawing characters
;  472     0730  1 !       to use based on the type of terminal.
;  473     0731  1 !
;  474     0732  1 !       The internal cursor position is not changed.
;  475     0733  1 !
;  476     0734  1 ! CALLING SEQUENCE:
;  477     0735  1 !
;  478     0736  1 !       ret_status.wlc.v = SMG$DRAW_RECTANGLE (DISPLAY_ID.rl.r,
;  479     0737  1 !                                              TOP_LEFT_ROW.rl.r,
;  480     0738  1 !                                              TOP_LEFT_COL.rl.r,
;  481     0739  1 !                                              BOTTOM_RIGHT_ROW.rl.r,
;  482     0740  1 !                                              BOTTOM_RIGHT_COL.rl.r,
;  483     0741  1 !                                              [,RENDITION_SET.rl.r]
;  484     0742  1 !                                              [,RENDITION_COMPLEMENT.rl.r]
;  485     0743  1 !
;  486     0744  1 ! FORMAL PARAMETERS:
;  487     0745  1 !
;  488     0746  1 !       DISPLAY_ID.rl.r         Display id of virtual display
;  489     0747  1 !
;  490     0748  1 !       TOP_LEFT_ROW.rl.r       Address of the row number of the top left
;  491     0749  1 !                               hand corner of the rectangle.
;  492     0750  1 !
;  493     0751  1 !       TOP_LEFT_COL.rl.r       Address of the column number of the top
;  494     0752  1 !                               left hand corner of the rectangle.
;  495     0753  1 !
;  496     0754  1 !       BOTTOM_RIGHT_ROW.rl.r   Address of the row number of the bottom right
;  497     0755  1 !                               hand corner of the rectangle.
;  498     0756  1 !
;  499     0757  1 !       BOTTOM_RIGHT_COL.rl.r   Address of the column number of the bottom
;  500     0758  1 !                               right hand corner of the rectangle.
;  501     0759  1 !
```

```
;  502     0760  1 !       RENDITION_SET.rl.r      Optional.  Each 1 bit in this parameter
;  503     0761  1 !                               causes the corresponding attribute to be
;  504     0762  1 !                               set in the display.  (See below for list
;  505     0763  1 !                               of settable attributes.)
;  506     0764  1 !
;  507     0765  1 !       RENDITION_COMPLEMENT.rl.r Optional.  Each 1 bit attribute in this
;  508     0766  1 !                                parameter causes the corresponding attribute
;  509     0767  1 !                                to be complemented in the display.  (See
;  510     0768  1 !                                below for list of complementable attributes.)
;  511     0769  1 !
;  512     0770  1 !
;  513     0771  1 !       If the same bit is specified in both the RENDITION_SET parameter
;  514     0772  1 !       and in the RENDITION_COMPLEMENT parameter, the application is
;  515     0773  1 !       RENDITION_SET followed by RENDITION complement.  Using these two
;  516     0774  1 !       parameters together the caller can exercise arbitrary and
;  517     0775  1 !       independent control over each attribute on a single call.  On an
;  518     0776  1 !       attribute by attribute basis he can cause the following
;  519     0777  1 !       transformations:
;  520     0778  1 !
;  521     0779  1 !               SET     COMPLEMENT      Action
;  522     0780  1 !               ---     ----------      ------
;  523     0781  1 !               0       0               Attribute unchanged.
;  524     0782  1 !               1       0               Attribute set to "on"
;  525     0783  1 !               0       1               Attribute set to complement of
;  526     0784  1 !                                       current setting.
;  527     0785  1 !               1       1               Attribute set to "off".
;  528     0786  1 !
;  529     0787  1 !
;  530     0788  1 !       Attributes which can be manipulated in this manner are:
;  531     0789  1 !
;  532     0790  1 !       SMG$M_BLINK  displays characters blinking.
;  533     0791  1 !       SMG$M_BOLD  displays characters in higher-than-normal
;  534     0792  1 !                   intensity.
;  535     0793  1 !       SMG$M_REVERSE  displays characters in reverse video -- that is,
;  536     0794  1 !                      using the opposite default rendition of the
;  537     0795  1 !                      virtual display.
;  538     0796  1 !       SMG$M_UNDERLINE  displays characters underlined.
;  539     0797  1 !
;  540     0798  1 !
;  541     0799  1 ! IMPLICIT INPUTS:
;  542     0800  1 !
;  543     0801  1 !       NONE
;  544     0802  1 !
;  545     0803  1 ! IMPLICIT OUTPUTS:
;  546     0804  1 !
;  547     0805  1 !       NONE
;  548     0806  1 !
;  549     0807  1 ! COMPLETION STATUS:
;  550     0808  1 !
;  551     0809  1 !       SS$_NORMAL      Normal successful completion
;  552     0810  1 !       SMG$_INVCOL     Invalid column number
;  553     0811  1 !       SMG$_INVROW     Invalid row number
;  554     0812  1 !       SMG$_WRONUMARG  Wrong number of arguments
;  555     0813  1 !
;  556     0814  1 ! SIDE EFFECTS:
;  557     0815  1 !
;  558     0816  1 !       NONE
```

```
;   559          0817  1 !
;   560          0818  1 !--
;   561          0819  1
;   562          0820  2     BEGIN
;   563          0821  2
;   564          0822  2     LOCAL
;   565          0823  2         BLROW,                          ! bottom left row
;   566          0824  2         BLCOL,                          ! bottom left column
;   567          0825  2         TRROW,                          ! top right row
;   568          0826  2         TRCOL,                          ! top right column
;   569          0827  2         POS,                            ! linear index into buffers
;   570          0828  2         LENGTH,                         ! length of line to draw
;   571          0829  2         TEXT_BUF : REF VECTOR [,BYTE],  ! ptr to dcb text buffer
;   572          0830  2         ATTR_BUF : REF VECTOR [,BYTE],  ! ptr to dcb attr buffer
;   573          0831  2         REND_CODE,                      ! rendition code to use
;   574          0832  2         DCB : REF BLOCK [,BYTE];        ! addr of display control block
;   575          0833  2
;   576          0834  2     BIND
;   577          0835  2         BRROW = .BOTTOM_RIGHT_ROW,
;   578          0836  2         BRCOL = .BOTTOM_RIGHT_COL,
;   579          0837  2         TLROW = .TOP_LEFT_ROW,
;   580          0838  2         TLCOL = .TOP_LEFT_COL;
;   581          0839  2
;   582          0840  2     LITERAL
;   583          0841  2         K_SET_ARG = 6,                  ! arg number of rend set
;   584          0842  2         K_COMP_ARG = 7;                 ! arg number of rend complement
;   585          0843  2
;   586          0844  2
;   587          0845  2     $SMG$GET_DCB (.DISPLAY_ID, DCB);    ! get addr of virtual display
;   588          0846  2                                         ! control block
;   589          0847  2     TEXT_BUF = .DCB [DCB_A_TEXT_BUF];
;   590          0848  2     ATTR_BUF = .DCB [DCB_A_ATTR_BUF];
;   591          0849  2
;   592          0850  2 !+
;   593          0851  2 ! Validate arguments passed.  Check for optionals.
;   594          0852  2 !-
;   595          0853  2
;   596          0854  2     $SMG$VALIDATE_ARGCOUNT (5, 7);
;   597          0855  2
;   598          0856  2     $SMG$VALIDATE_ROW_COL (.TLROW, .TLCOL);
;   599          0857  2
;   600          0858  2     $SMG$VALIDATE_ROW_COL (.BRROW, .BRCOL);
;   601          0859  2
;   602          0860  2     $SMG$SET_REND_CODE (K_SET_ARG, K_COMP_ARG);
;   603          0861  2                                         ! macro to use caller's args if present
;   604          0862  2
;   605          0863  2 !+
;   606          0864  2 ! The caller passed us two of four points needed to construct a rectangle.
;   607          0865  2 ! Compute the other two and make sure they are within the display.
;   608          0866  2 !-
;   609          0867  2
;   610          0868  2     BLROW = .BRROW;
;   611          0869  2     BLCOL = .TLCOL;
;   612          0870  2     TRROW = .TLROW;
;   613          0871  2     TRCOL = .BRCOL;
;   614          0872  2
;   615          0873  2     $SMG$VALIDATE_ROW_COL (.BLROW, .BLCOL);
```

```
;  616     0874  2     $SMG$VALIDATE_ROW_COL (.TRROW, .TRCOL);
;  617     0875  2
;  618     0876  2 !+
;  619     0877  2 ! We need to draw 4 lines, 2 horizontal and 2 vertical.
;  620     0878  2 !
;  621     0879  2 ! Draw the top.
;  622     0880  2 !-
;  623     0881  2
;  624     0882  2     BEGIN
;  625     0883  2     BIND
;  626     0884  2         LINE_CHAR = .DCB [DCB_A_LINE_CHAR];
;  627     0885  2     MAP
;  628     0886  2         LINE_CHAR : VECTOR [,BYTE];
;  629     0887  2
;  630     0888  2         !+
;  631     0889  2         ! Reset the line characteristics vector if there was previously
;  632     0890  2         ! some double high or double wide text.
;  633     0891  2         !-
;  634     0892  2
;  635     0893  2         IF .LINE_CHAR [.TLROW] NEQ 0
;  636     0894  2         THEN
;  637     0895  2             $RESET_LINE (.TLROW);
;  638     0896  2
;  639     0897  2         !+
;  640     0898  2         ! Move horizontal characters to text buffer.  Horizontal chars consist
;  641     0899  2         ! of a left & right segment - the left end of the line needs only a right
;  642     0900  2         ! segment, the right end of the line needs a left segment, and all the
;  643     0901  2         ! positions in between need both.  Corners will automatically form the
;  644     0902  2         ! correct characters by ORing the up/down and right/left elements.
;  645     0903  2         !-
;  646     0904  2
;  647     0905  2         POS = $SMG$LINEAR (.TLROW, .TLCOL);
;  648     0906  2         LENGTH = .TRCOL - .TLCOL + 1;
;  649     0907  2
;  650     0908  2         $INSERT_LINE_CHAR (BORD_M_RIGHT);
;  651     0909  2         POS = .POS + 1;
;  652     0910  2
;  653     0911  2         INCR NUM_CHAR FROM 2 TO (.LENGTH - 1) DO
;  654     0912  2         BEGIN
;  655     0913  3             $INSERT_LINE_CHAR (BORD_M_HORIZ);
;  656     0914  3             POS = .POS + 1;
;  657     0915  2         END;
;  658     0916  2
;  659     0917  2         $INSERT_LINE_CHAR (BORD_M_LEFT);
;  660     0918  2
;  661     0919  2 !+
;  662     0920  2 ! Draw the bottom.
;  663     0921  2 !-
;  664     0922  2
;  665     0923  2         IF .LINE_CHAR [.BLROW] NEQ 0
;  666     0924  2         THEN
;  667     0925  2             $RESET_LINE (.BLROW);           ! reset if prev. dbl hi/wide
;  668     0926  2
;  669     0927  2         POS = $SMG$LINEAR (.BLROW, .BLCOL);
;  670     0928  2         LENGTH = .BRCOL - .BLCOL + 1;
;  671     0929  2
;  672     0930  3         $INSERT_LINE_CHAR (BORD_M_RIGHT);   ! left end of line
```

```
;  673          0931  3      POS = .POS + 1;
;  674          0932  3
;  675          0933  3      INCR NUM_CHAR FROM 2 TO (.LENGTH - 1) DO  ! middle of line
;  676          0934  4      BEGIN
;  677          0935  4          $INSERT_LINE_CHAR (BORD_M_HORIZ);
;  678          0936  4          POS = .POS + 1;
;  679          0937  4      END;
;  680          0938  3
;  681          0939  3      $INSERT_LINE_CHAR (BORD_M_LEFT);    ! right end of line
;  682          0940  3
;  683          0941  3  !+
;  684          0942  3  ! Draw the right.
;  685          0943  3  !-
;  686          0944  3
;  687          0945  3      !+
;  688          0946  3      ! A vertical line requires resetting multi elements in
;  689          0947  3      ! the line characteristics vector.
;  690          0948  3      !-
;  691          0949  3
;  692          0950  3      INCR ROW FROM .TRROW TO .BRROW DO
;  693          0951  4      BEGIN
;  694          0952  4          IF .LINE_CHAR [.ROW] NEQ 0
;  695          0953  4          THEN
;  696          0954  4              $RESET_LINE (.ROW);
;  697          0955  4      END;
;  698          0956  3
;  699          0957  3      POS = $SMG$LINEAR (.TRROW, .TRCOL);
;  700          0958  3      LENGTH = .BRROW - .TRROW + 1;
;  701          0959  3
;  702          0960  3      $INSERT_LINE_CHAR (BORD_M_DOWN);
;  703          0961  3      POS = .POS + .DCB [DCB_W_NO_COLS];
;  704          0962  3
;  705          0963  3      INCR ROW FROM 2 TO (.LENGTH - 1) DO
;  706          0964  4      BEGIN
;  707          0965  4          $INSERT_LINE_CHAR (BORD_M_VERT);
;  708          0966  4          POS = .POS + .DCB [DCB_W_NO_COLS];
;  709          0967  4      END;
;  710          0968  3
;  711          0969  3      $INSERT_LINE_CHAR (BORD_M_UP);
;  712          0970  3
;  713          0971  3  !+
;  714          0972  3  ! Draw the left.
;  715          0973  3  !-
;  716          0974  3
;  717          0975  3      INCR ROW FROM .TLROW TO .BLROW DO
;  718          0976  4      BEGIN
;  719          0977  4          IF .LINE_CHAR [.ROW] NEQ 0
;  720          0978  4          THEN
;  721          0979  4              $RESET_LINE (.ROW);
;  722          0980  4      END;
;  723          0981  3
;  724          0982  3      POS = $SMG$LINEAR (.TLROW, .TLCOL);
;  725          0983  3      LENGTH = .BLROW - .TLROW + 1;
;  726          0984  3
;  727          0985  3      $INSERT_LINE_CHAR (BORD_M_DOWN);
;  728          0986  3      POS = .POS + .DCB [DCB_W_NO_COLS];
;  729          0987  3
```

```
0988 3      INCR ROW FROM 2 TO (.LENGTH - 1) DO
0989 4      BEGIN
0990 4          $INSERT_LINE_CHAR (BORD_M_VERT);
0991 4          POS = .POS + .DCB [DCB_Q_NO_COLS];
0992 3      END;
0993 3
0994 3      $INSERT_LINE_CHAR (BORD_M_UP);
0995 3
0996 2      END;
0997 2
0998 2
0999 2  !+
1000 2  ! See if this change should be reflected on the screen immediately.
1001 2  !-
1002 2
1003 3      RETURN (SMG$$CHECK_FOR_OUTPUT_DCB (.DCB,
1004 3                                         0,          ! no function code for this
1005 2                                         .TLROW));
1006 2
1007 2
1008 1      END;                                ! End of routine SMG$DRAW_RECTANGLE
```

```
                                 0FFC 00000        .ENTRY  SMG$DRAW_RECTANGLE, Save R2,R3,R4,R5,R6,R7,-; 0704
                                                           R8,R9,R10,R11                               ;
                   5E      C0  AE   9E 00002       MOVAB   -64(SP), SP                                 ;
                   50      04  BC   D0 00006       MOVL    @DISPLAY_ID, R0                             ; 0845
             04    BC      38  A0   D1 0000A       CMPL    56(R0), @DISPLAY_ID                         ;
                               06   12 0000F       BNEQ    1$                                          ;
                   11      44  A0   91 00011       CMPB    68(R0), #17                                 ;
                               08   13 00015       BEQL    2$                                          ;
                   50 00000000G 8F  D0 00017 1$:   MOVL    #SMG$_INVDIS_ID, R0                         ;
                               04      0001E       RET                                                 ;
             0C    AE      04  BC   D0 0001F 2$:   MOVL    @DISPLAY_ID, DCB                            ;
       50    0C    AE          10   C1 00024       ADDL3   #16, DCB, R0                                ; 0847
             3C    AE          60   D0 00029       MOVL    (R0), 60(SP)                                ;
       50    0C    AE          14   C1 0002D       ADDL3   #20, DCB, R0                                ; 0848
             38    AE          60   D0 00032       MOVL    (R0), 56(SP)                                ;
             04    AE      38  AE   7D 00036       MOVQ    56(SP), ATTR_BUF                            ;
       50          6C          05   83 0003B       SUBB3   #5, (AP), DIFF                              ; 0854
                   02          50   91 0003F       CMPB    DIFF, #2                                    ;
                               08   1B 00042       BLEQU   3$                                          ;
                   50 00000000G 8F  D0 00044       MOVL    #SMG$_WRONUMARG, R0                         ;
                               04      0004B       RET                                                 ;
             24    AE      08  BC   D0 0004C 3$:   MOVL    @TOP_LEFT_ROW, 36(SP)                       ; 0856
                               0D   15 00051       BLEQ    4$                                          ;
       50    0C    AE          02   C1 00053       ADDL3   #2, DCB, R0                                 ;
24 AE  60          10          00   ED 00058       CMPZV   #0, #16, (R0), 36(SP)                       ;
                               08   18 0005E       BGEQ    5$                                          ;
                   50 00000000G 8F  D0 00060 4$:   MOVL    #SMG$_INVROW, R0                            ;
                               04      00067       RET                                                 ;
                   59      0C  BC   D0 00068 5$:   MOVL    @TOP_LEFT_COL, R9                           ;
                               0C   15 0006C       BLEQ    6$                                          ;
       50    0C    AE          06   C1 0006E       ADDL3   #6, DCB, R0                                 ;
```

```
      59          60          10              00 ED 00073          CMPZV   #0, #16, (R0), R9
                                              08 18 00078          BGEQ    7$
                              50 00000000G    8F D0 0007A 6$:      MOVL    #SMG$_INVCOL, R0
                                                 04 00081          RET
                      28      AE      10      BC D0 00082 7$:      MOVL    @BOTTOM_RIGHT_ROW, 40(SP)
                                              0D 15 00087          BLEQ    8$
                  50  0C      AE              02 C1 00089          ADDL3   #2, DCB, R0
  28  AE          60          10              00 ED 0008E          CMPZV   #0, #16, (R0), 40(SP)
                                              08 18 00094          BGEQ    9$
                              50 00000000G    8F D0 00096 8$:      MOVL    #SMG$_INVROW, R0
                                                 04 0009D          RET
                      2C      AE      14      BC D0 0009E 9$:      MOVL    @BOTTOM_RIGHT_COL, 44(SP)
                                              0D 15 000A3          BLEQ    10$
                  50  0C      AE              06 C1 000A5          ADDL3   #6, DCB, R0
  2C  AE          60          10              00 ED 000AA          CMPZV   #0, #16, (R0), 44(SP)
                                              08 18 000B0          BGEQ    11$
                              50 00000000G    8F D0 000B2 10$:     MOVL    #SMG$_INVCOL, R0
                                                 04 000B9          RET
                  50  0C      AE              2E C1 000BA 11$:     ADDL3   #46, DCB, R0
                      34      AE              60 9A 000BF          MOVZBL  (R0), 52(SP)
                      18      AE      34      AE D0 000C3          MOVL    52(SP), REND_CODE
                              06              6C 91 000C8          CMPB    (AP), #6
                                              0A 1F 000CB          BLSSU   12$
                                      18      AC D5 000CD          TSTL    24(AP)
                                              05 13 000D0          BEQL    12$
                      18      AE      18      BC C8 000D2          BISL2   @RENDITION_SET, REND_CODE
                              07              6C 91 000D7 12$:     CMPB    (AP), #7
                                              0A 1F 000DA          BLSSU   13$
                                      1C      AC D5 000DC          TSTL    28(AP)
                                              05 13 000DF          BEQL    13$
                      18      AE      1C      BC CC 000E1          XORL2   @RENDITION_COMPLEMENT, REND_CODE
                              58      28      AE D0 000E6 13$:     MOVL    40(SP), BLROW
                      20      AE              59 D0 000EA          MOVL    R9, BLCOL
                              5B      24      AE D0 000EE          MOVL    36(SP), TRROW
                              5A      2C      AE D0 000F2          MOVL    44(SP), TRCOL
                                              58 D5 000F6          TSTL    BLROW
                                              0C 15 000F8          BLEQ    14$
                  50  0C      AE              02 C1 000FA          ADDL3   #2, DCB, R0
      58          60          10              00 ED 000FF          CMPZV   #0, #16, (R0), BLROW
                                              08 18 00104          BGEQ    15$
                              50 00000000G    8F D0 00106 14$:     MOVL    #SMG$_INVROW, R0
                                                 04 0010D          RET
                                      20      AE D5 0010E 15$:     TSTL    BLCOL
                                              0D 15 00111          BLEQ    16$
                  50  0C      AE              06 C1 00113          ADDL3   #6, DCB, R0
  20  AE          60          10              00 ED 00118          CMPZV   #0, #16, (R0), BLCOL
                                              08 18 0011E          BGEQ    17$
                              50 00000000G    8F D0 00120 16$:     MOVL    #SMG$_INVCOL, R0
                                                 04 00127          RET
                                              5B D5 00128 17$:     TSTL    TRROW
                                              0C 15 0012A          BLEQ    18$
                  50  0C      AE              02 C1 0012C          ADDL3   #2, DCB, R0
      5B          60          10              00 ED 00131          CMPZV   #0, #16, (R0), TRROW
                                              08 18 00136          BGEQ    19$
                              50 00000000G    8F D0 00138 18$:     MOVL    #SMG$_INVROW, R0
                                                 04 0013F          RET
                                              5A D5 00140 19$:     TSTL    TRCOL
```

```
                                      0C   15 00142        BLEQ    20$                                      :
                  50      0C   AE          06   C1 00144        ADDL3   #6, DCB, R0                              :
      5A          60           10          00   ED 00149        CMPZV   #0, #16, (R0), TRCOL                     :
                                           08   18 0014E        BGEQ    21$                                      :
                          50 00000000G     8F   D0 00150 20$:   MOVL    #SMG$_INVCOL, R0                         :
                                           04      00157        RET                                              :
                  50      0C   AE 0000004C 8F   C1 00158 21$:   ADDL3   #76, DCB, R0                             : 0893
                  50           60       24 AE   C1 00161        ADDL3   36(SP), (R0), R0                         :
                                           60   95 00166        TSTB    (R0)                                     :
                                           75   13 00168        BEQL    23$                                      :
                  50      24   AE          01   C3 0016A        SUBL3   #1, 36(SP), R0                           : 0895
                  52      0C   AE          06   C1 0016F        ADDL3   #6, DCB, R2                              :
                               51          62   3C 00174        MOVZWL  (R2), R1                                 :
                               50          51   C4 00177        MULL2   R1, R0                                   :
                  52      0C   AE          04   C1 0017A        ADDL3   #4, DCB, R2                              :
                               51          62   3C 0017F        MOVZWL  (R2), R1                                 :
                          30   AE    FF A140    9E 00182        MOVAB   -1(R1)[R0], START_INDEX                  :
                               50       3C AE   D0 00188        MOVL    60(SP), TEXT_BUF                         :
                               56       38 AE   D0 0018C        MOVL    56(SP), ATTR_BUF                         :
                  51      0C   AE          18   C1 00190        ADDL3   #24, DCB, R1                             :
                               57          61   D0 00195        MOVL    (R1), CHAR_BUF                           :
            1C    AE      0C   AE          06   C1 00198        ADDL3   #6, DCB, 28(SP)                          :
  1C  BE          20           6E          00   2C 0019E        MOVC5   #0, (SP), #32, @28(SP), @START_INDEX-    :
                                   30 BE40         001A4                [TEXT_BUF]                               :
            1C    AE      0C   AE          06   C1 001A7        ADDL3   #6, DCB, 28(SP)                          :
  1C  BE    34    AE           6E          00   2C 001AD        MOVC5   #0, (SP), 52(SP), @28(SP), @START_INDEX- :
                                   30 BE46         001B4                [ATTR_BUF]                               :
                                           57   D5 001B7        TSTL    CHAR_BUF                                 :
                                           14   13 001B9        BEQL    22$                                      :
                  56      0C   AE          06   C1 001BB        ADDL3   #6, DCB, R6                              :
            1C    AE      0C   AE          30   C1 001C0        ADDL3   #48, DCB, 28(SP)                         :
      66    1C    BE           6E          00   2C 001C6        MOVC5   #0, (SP), @28(SP), (R6), @START_INDEX-   :
                                   30 BE47         001CC                [CHAR_BUF]                               :
                  50      0C   AE 0000004C 8F   C1 001CF 22$:   ADDL3   #76, DCB, R0                             :
                  50           60       24 AE   C1 001D8        ADDL3   36(SP), (R0), R0                         :
                                           60   94 001DD        CLRB    (R0)                                     :
                  50      24   AE          01   C3 001DF 23$:   SUBL3   #1, 36(SP), R0                           : 0905
                  51      0C   AE          06   C1 001E4        ADDL3   #6, DCB, R1                              :
                          14   AE          61   3C 001E9        MOVZWL  (R1), 20(SP)                             :
                               50       14 AE   C4 001ED        MULL2   20(SP), R0                               :
                          30   AE    FF A940    9E 001F1        MOVAB   -1(R9)[R0], 48(SP)                       :
                               56       30 AE   D0 001F7        MOVL    48(SP), POS                              :
                  59           5A          59   C3 001FB        SUBL3   R9, TRCOL, R9                            : 0906
                                           59   D6 001FF        INCL    LENGTH                                   :
                               51       04 AE   D0 00201        MOVL    ATTR_BUF, R1                             : 0908
                  1F         6641          06   E1 00205        BBC     #6, (POS)[R1], 24$                       :
                               50       08 AE   D0 0020A        MOVL    TEXT_BUF, R0                             :
                             6640          01   88 0020E        BISB2   #1, (POS)[R0]                            :
                               52       04 AE   D0 00212        MOVL    ATTR_BUF, R2                             :
                               50     6642      9A 00216        MOVZBL  (POS)[R2], R0                            :
                               50          0F   CA 0021A        BICL2   #15, R0                                  :
                               53       04 AE   D0 0021D        MOVL    ATTR_BUF, R3                             :
               6643            50       18 AE   89 00221        BISB3   REND_CODE, R0, (POS)[R3]                 :
                                           13   11 00227        BRB     25$                                      :
                               50       08 AE   D0 00229 24$:   MOVL    TEXT_BUF, R0                             :
                             6640          01   90 0022D        MOVB    #1, (POS)[R0]                            :
                               50       04 AE   D0 00231        MOVL    ATTR_BUF, R0                             :
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             6640      18  AE       40  8F 89 00235          BISB3   #64, REND_CODE, (POS)[R0]                      ;
                                        56 D6 0023C 25$:     INCL    POS                                            ; 0909
                           51           01 D0 0023E          MOVL    #1, NUM_CHAR                                   ; 0911
                                        3D 11 00241          BRB     29$                                            ;
                           52       04  AE D0 00243 26$:     MOVL    ATTR_BUF, R2                                   ; 0913
               1F        6642           06 E1 00247          BBC     #6, (POS)[R2], 27$                             ;
                           50       08  AE D0 0024C          MOVL    TEXT_BUF, R0                                   ;
                         6640           05 88 00250          BISB2   #5, (POS)[R0]                                  ;
                           53       04  AE D0 00254          MOVL    ATTR_BUF, R3                                   ;
                           50     6643  9A 00258             MOVZBL  (POS)[R3], R0                                  ;
                           50           0F CA 0025C          BICL2   #15, R0                                        ;
                           54       04  AE D0 0025F          MOVL    ATTR_BUF, R4                                   ;
             6644          50       18  AE 89 00263          BISB3   REND_CODE, R0, (POS)[R4]                       ;
                                        13 11 00269          BRB     28$                                            ;
                           50       08  AE D0 0026B 27$:     MOVL    TEXT_BUF, R0                                   ;
                         6640           05 90 0026F          MOVB    #5, (POS)[R0]                                  ;
                           50       04  AE D0 00273          MOVL    ATTR_BUF, R0                                   ;
             6640      18  AE       40  8F 89 00277          BISB3   #64, REND_CODE, (POS)[R0]                      ;
                                        56 D6 0027E 28$:     INCL    POS                                            ; 0914
               BF          51           59 F2 00280 29$:     AOBLSS  LENGTH, NUM_CHAR, 26$                          ; 0911
                           51       04  AE D0 00284          MOVL    ATTR_BUF, R1                                   ; 0917
               1F        6641           06 E1 00288          BBC     #6, (POS)[R1], 30$                             ;
                           50       08  AE D0 0028D          MOVL    TEXT_BUF, R0                                   ;
                         6640           04 88 00291          BISB2   #4, (POS)[R0]                                  ;
                           52       04  AE D0 00295          MOVL    ATTR_BUF, R2                                   ;
                           50     6642  9A 00299             MOVZBL  (POS)[R2], R0                                  ;
                           50           0F CA 0029D          BICL2   #15, R0                                        ;
                           53       04  AE D0 002A0          MOVL    ATTR_BUF, R3                                   ;
             6643          50       18  AE 89 002A4          BISB3   REND_CODE, R0, (POS)[R3]                       ;
                                        13 11 002AA          BRB     31$                                            ;
                           50       08  AE D0 002AC 30$:     MOVL    TEXT_BUF, R0                                   ;
                         6640           04 90 002B0          MOVB    #4, (POS)[R0]                                  ;
                           50       04  AE D0 002B4          MOVL    ATTR_BUF, R0                                   ;
             6640      18  AE       40  8F 89 002B8          BISB3   #64, REND_CODE, (POS)[R0]                      ;
               50      0C  AE 0000004C  8F C1 002BF 31$:     ADDL3   #76, DCB, R0                                   ; 0923
                                00 B048 95 002C8             TSTB    @0(R0)[BLROW]                                  ;
                                        5F 13 002CC          BEQL    33$                                            ;
                           50       FF  A8 9E 002CE          MOVAB   -1(R8), R0                                     ; 0925
                           50       14  AE C4 002D2          MULL2   20(SP), R0                                     ;
               52      0C  AE           04 C1 002D6          ADDL3   #4, DCB, R2                                    ;
                           51           62 3C 002DB          MOVZWL  (R2), R1                                       ;
                       1C  AE       FF A140 9E 002DE         MOVAB   -1(R1)[R0], START_INDEX                        ;
                           50       3C  AE D0 002E4          MOVL    60(SP), TEXT_BUF                               ;
                           57       38  AE D0 002E8          MOVL    56(SP), ATTR_BUF                               ;
               51      0C  AE           18 C1 002EC          ADDL3   #24, DCB, R1                                   ;
                       10  AE           61 D0 002F1          MOVL    (R1), CHAR_BUF                                 ;
   14   AE     20          6E           00 2C 002F5          MOVC5   #0, (SP), #32, 20(SP), @START_INDEX-           ;
                                   1C BE40    002FB                  [TEXT_BUF]                                     ;
   14   AE     34   AE     6E           00 2C 002FE          MOVC5   #0, (SP), 52(SP), 20(SP), @START_INDEX-        ;
                                   1C BE47    00305                  [ATTR_BUF]                                     ;
                                    10  AE D5 00308          TSTL    CHAR_BUF                                       ;
                                        13 13 0030B          BEQL    32$                                            ;
                           57       10  AE D0 0030D          MOVL    CHAR_BUF, R7                                   ;
               6E      0C  AE           30 C1 00311          ADDL3   #48, DCB, (SP)                                 ;
   14   AE     00   BE     6E           00 2C 00316          MOVC5   #0, (SP), @0(SP), 20(SP), @START_INDEX[R7]     ;
                                   1C BE47    0031D                                                                 ;
               50      0C  AE 0000004C  8F C1 00320 32$:     ADDL3   #76, DCB, R0                                   ;
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                              00 B048  94 00329        CLRB    @0(R0)[BLROW]                       ;
                   50         FF  A8  9E 0032D 33$:    MOVAB   -1(R8), R0                          ; 0927
                   50         14  AE  C4 00331         MULL2   20(SP), R0                          ;
      51     20    AE             01  C3 00335         SUBL3   #1, BLCOL, R1                       ;
      56           50             51  C1 0033A         ADDL3   R1, R0, POS                         ;
      50     2C    AE         20  AE  C3 0033E         SUBL3   BLCOL, 44(SP), R0                   ; 0928
                   59             01  A0  9E 00344     MOVAB   1(R0), LENGTH                       ;
                   51         04  AE  D0 00348         MOVL    ATTR_BUF, R1                        ; 0930
      1F         6641             06  E1 0034C         BBC     #6, (POS)[R1], 34$                  ;
                   50         08  AE  D0 00351         MOVL    TEXT_BUF, R0                        ;
                 6640             01  88 00355         BISB2   #1, (POS)[R0]                       ;
                   52         04  AE  D0 00359         MOVL    ATTR_BUF, R2                        ;
                   50       6642      9A 0035D         MOVZBL  (POS)[R2], R0                       ;
                   50             0F  CA 00361         BICL2   #15, R0                             ;
                   53         04  AE  D0 00364         MOVL    ATTR_BUF, R3                        ;
    6643           50         18  AE  89 00368         BISB3   REND_CODE, R0, (POS)[R3]            ;
                              13  11 0036E             BRB     35$                                 ;
                   50         08  AE  D0 00370 34$:    MOVL    TEXT_BUF, R0                        ;
                 6640             01  90 00374         MOVB    #1, (POS)[R0]                       ;
                   50         04  AE  D0 00378         MOVL    ATTR_BUF, R0                        ;
    6640     18    AE         40  8F  89 0037C         BISB3   #64, REND_CODE, (POS)[R0]           ;
                              56  D6 00383 35$:        INCL    POS                                 ; 0931
                   51             01  D0 00385         MOVL    #1, NUM_CHAR                        ; 0933
                              3D  11 00388             BRB     39$                                 ;
                   52         04  AE  D0 0038A 36$:    MOVL    ATTR_BUF, R2                        ; 0935
      1F         6642             06  E1 0038E         BBC     #6, (POS)[R2], 37$                  ;
                   50         08  AE  D0 00393         MOVL    TEXT_BUF, R0                        ;
                 6640             05  88 00397         BISB2   #5, (POS)[R0]                       ;
                   53         04  AE  D0 0039B         MOVL    ATTR_BUF, R3                        ;
                   50       6643      9A 0039F         MOVZBL  (POS)[R3], R0                       ;
                   50             0F  CA 003A3         BICL2   #15, R0                             ;
                   54         04  AE  D0 003A6         MOVL    ATTR_BUF, R4                        ;
    6644           50         18  AE  89 003AA         BISB3   REND_CODE, R0, (POS)[R4]            ;
                              13  11 003B0             BRB     38$                                 ;
                   50         08  AE  D0 003B2 37$:    MOVL    TEXT_BUF, R0                        ;
                 6640             05  90 003B6         MOVB    #5, (POS)[R0]                       ;
                   50         04  AE  D0 003BA         MOVL    ATTR_BUF, R0                        ;
    6640     18    AE         40  8F  89 003BE         BISB3   #64, REND_CODE, (POS)[R0]           ;
                              56  D6 003C5 38$:        INCL    POS                                 ; 0936
      BF           51             59  F2 003C7 39$:    AOBLSS  LENGTH, NUM_CHAR, 36$               ; 0933
                   51         04  AE  D0 003CB         MOVL    ATTR_BUF, R1                        ; 0939
      1F         6641             06  E1 003CF         BBC     #6, (POS)[R1], 40$                  ;
                   50         08  AE  D0 003D4         MOVL    TEXT_BUF, R0                        ;
                 6640             04  88 003D8         BISB2   #4, (POS)[R0]                       ;
                   52         04  AE  D0 003DC         MOVL    ATTR_BUF, R2                        ;
                   50       6642      9A 003E0         MOVZBL  (POS)[R2], R0                       ;
                   50             0F  CA 003E4         BICL2   #15, R0                             ;
                   53         04  AE  D0 003E7         MOVL    ATTR_BUF, R3                        ;
    6643           50         18  AE  89 003EB         BISB3   REND_CODE, R0, (POS)[R3]            ;
                              13  11 003F1             BRB     41$                                 ;
                   50         08  AE  D0 003F3 40$:    MOVL    TEXT_BUF, R0                        ;
                 6640             04  90 003F7         MOVB    #4, (POS)[R0]                       ;
                   50         04  AE  D0 003FB         MOVL    ATTR_BUF, R0                        ;
    6640     18    AE         40  8F  89 003FF         BISB3   #64, REND_CODE, (POS)[R0]           ;
                   57         FF  AB  9E 00406 41$:    MOVAB   -1(R11), ROW                        ; 0950
                              78  11 0040A             BRB     44$                                 ;
      50     0C    AE 0000004C    8F  C1 0040C 42$:    ADDL3   #76, DCB, R0                        ; 0952
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                                     00 B047  95 00415        TSTB    @0(R0)[ROW]                              ;
                                          69  13 00419        BEQL    44$                                      ;
                           50       FF    A7  9E 0041B        MOVAB   -1(R7), R0                               ; 0954
                           50       14    AE  C4 0041F        MULL2   20(SP), R0                               ;
              52       0C  AE             04  C1 00423        ADDL3   #4, DCB, R2                              ;
                           51             62  3C 00428        MOVZWL  (R2), R1                                 ;
                       2C  AE       FF  A140  9E 0042B        MOVAB   -1(R1)[R0], START_INDEX                  ;
                           50       3C    AE  D0 00431        MOVL    60(SP), TEXT_BUF                         ;
                       1C  AE       38    AE  D0 00435        MOVL    56(SP), ATTR_BUF                         ;
              51       0C  AE             18  C1 0043A        ADDL3   #24, DCB, R1                             ;
                       20  AE             61  D0 0043F        MOVL    (R1), CHAR_BUF                           ;
  14    AE    20           6E             00  2C 00443        MOVC5   #0, (SP), #32, 20(SP), @START_INDEX-     ;
                                     2C BE40     00449                [TEXT_BUF]                               ;
        10    AE       2C  AE       1C    AE  C1 0044C        ADDL3   ATTR_BUF, START_INDEX, 16(SP)            ;
  14    AE    34  AE       6E             00  2C 00453        MOVC5   #0, (SP), 52(SP), 20(SP), @16(SP)        ;
                                    10    BE     0045A                                                         ;
                                    20    AE  D5 0045C        TSTL    CHAR_BUF                                 ;
                                          16  13 0045F        BEQL    43$                                      ;
        1C    AE       2C  AE       20    AE  C1 00461        ADDL3   CHAR_BUF, START_INDEX, 28(SP)            ;
        10    AE       0C  AE             30  C1 00468        ADDL3   #48, DCB, 16(SP)                         ;
  14    AE    10  BE       6E             00  2C 0046E        MOVC5   #0, (SP), @16(SP), 20(SP), @28(SP)       ;
                                    1C    BE     00475                                                         ;
              50       0C  AE 0000004C    8F  C1 00477 43$:   ADDL3   #76, DCB, R0                             ;
                                     00 B047  94 00480        CLRB    @0(R0)[ROW]                              ;
              83           57       28    AE  F3 00484 44$:   AOBLEQ  40(SP), ROW, 42$                         ; 0950
                           57       FF    AB  9E 00489        MOVAB   -1(R11), R7                              ; 0957
                           57       14    AE  C4 0048D        MULL2   20(SP), R7                               ;
                           56       FF  AA47  9E 00491        MOVAB   -1(TRCOL)[R7], POS                       ;
              5A       28  AE             5B  C3 00496        SUBL3   TRROW, 40(SP), R10                       ; 0958
                           59       01    AA  9E 0049B        MOVAB   1(R10), LENGTH                           ;
                           51       04    AE  D0 0049F        MOVL    ATTR_BUF, R1                             ; 0960
              1F         6641             06  E1 004A3        BBC     #6, (POS)[R1], 45$                       ;
                           50       08    AE  D0 004A8        MOVL    TEXT_BUF, R0                             ;
                         6640             08  88 004AC        BISB2   #8, (POS)[R0]                            ;
                           52       04    AE  D0 004B0        MOVL    ATTR_BUF, R2                             ;
                           50           6642  9A 004B4        MOVZBL  (POS)[R2], R0                            ;
                           50             0F  CA 004B8        BICL2   #15, R0                                  ;
                           53       04    AE  D0 004BB        MOVL    ATTR_BUF, R3                             ;
            6643           50       18    AE  89 004BF        BISB3   REND_CODE, R0, (POS)[R3]                 ;
                                          13  11 004C5        BRB     46$                                      ;
                           50       08    AE  D0 004C7 45$:   MOVL    TEXT_BUF, R0                             ;
                         6640             08  90 004CB        MOVB    #8, (POS)[R0]                            ;
                           50       04    AE  D0 004CF        MOVL    ATTR_BUF, R0                             ;
            6640       18  AE       40    8F  89 004D3        BISB3   #64, REND_CODE, (POS)[R0]                ;
                           56       14    AE  C0 004DA 46$:   ADDL2   20(SP), POS                              ; 0961
                           51             01  D0 004DE        MOVL    #1, ROW                                  ; 0963
                                          3F  11 004E1        BRB     50$                                      ;
                           52       04    AE  D0 004E3 47$:   MOVL    ATTR_BUF, R2                             ; 0965
              1F         6642             06  E1 004E7        BBC     #6, (POS)[R2], 48$                       ;
                           50       08    AE  D0 004EC        MOVL    TEXT_BUF, R0                             ;
                         6640             0A  88 004F0        BISB2   #10, (POS)[R0]                           ;
                           53       04    AE  D0 004F4        MOVL    ATTR_BUF, R3                             ;
                           50           6643  9A 004F8        MOVZBL  (POS)[R3], R0                            ;
                           50             0F  CA 004FC        BICL2   #15, R0                                  ;
                           54       04    AE  D0 004FF        MOVL    ATTR_BUF, R4                             ;
            6644           50       18    AE  89 00503        BISB3   REND_CODE, R0, (POS)[R4]                 ;
                                          13  11 00509        BRB     49$                                      ;
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                        50       08    AE   D0 0050B 48$:    MOVL    TEXT_BUF, R0                               ;
                      6640             0A   90 0050F         MOVB    #10, (POS)[R0]                             ;
                        50       04    AE   D0 00513         MOVL    ATTR_BUF, R0                               ;
           6640    18   AE       40    8F   89 00517         BISB3   #64, REND_CODE, (POS)[R0]                  ;
                        56       14    AE   C0 0051E 49$:    ADDL2   20(SP), POS                                ; 0966
             BD         51             59   F2 00522 50$:    AOBLSS  LENGTH, ROW, 47$                           ; 0963
                        51       04    AE   D0 00526         MOVL    ATTR_BUF, R1                               ; 0969
             1F       6641             06   E1 0052A         BBC     #6, (POS)[R1], 51$                         ;
                        50       08    AE   D0 0052F         MOVL    TEXT_BUF, R0                               ;
                      6640             02   88 00533         BISB2   #2, (POS)[R0]                              ;
                        52       04    AE   D0 00537         MOVL    ATTR_BUF, R2                               ;
                        50           6642   9A 0053B         MOVZBL  (POS)[R2], R0                              ;
                        50             0F   CA 0053F         BICL2   #15, R0                                    ;
                        53       04    AE   D0 00542         MOVL    ATTR_BUF, R3                               ;
           6643         50       18    AE   89 00546         BISB3   REND_CODE, R0, (POS)[R3]                   ;
                                       13   11 0054C         BRB     52$                                        ;
                        50       08    AE   D0 0054E 51$:    MOVL    TEXT_BUF, R0                               ;
                      6640             02   90 00552         MOVB    #2, (POS)[R0]                              ;
                        50       04    AE   D0 00556         MOVL    ATTR_BUF, R0                               ;
           6640    18   AE       40    8F   89 0055A         BISB3   #64, REND_CODE, (POS)[R0]                  ;
             5A    24   AE             01   C3 00561 52$:    SUBL3   #1, 36(SP), ROW                            ; 0975
                                       67   11 00566         BRB     55$                                        ;
             50    0C   AE 0000004C    8F   C1 00568 53$:    ADDL3   #76, DCB, R0                               ; 0977
                              00 B04A       95 00571         TSTB    @0(R0)[ROW]                                ;
                                       58   13 00575         BEQL    55$                                        ;
                        50       FF    AA   9E 00577         MOVAB   -1(R10), R0                                ; 0979
                        50       14    AE   C4 0057B         MULL2   20(SP), R0                                 ;
             52    0C   AE             04   C1 0057F         ADDL3   #4, DCB, R2                                ;
                        51             62   3C 00584         MOVZWL  (R2), R1                                   ;
             2C         AE       FF  A140   9E 00587         MOVAB   -1(R1)[R0], START_INDEX                    ;
                        50       3C    AE   D0 0058D         MOVL    60(SP), TEXT_BUF                           ;
                        57       38    AE   D0 00591         MOVL    56(SP), ATTR_BUF                           ;
             51    0C   AE             18   C1 00595         ADDL3   #24, DCB, R1                               ;
                        5B             61   D0 0059A         MOVL    (R1), CHAR_BUF                             ;
 14   AE     20         6E             00   2C 0059D         MOVC5   #0, (SP), #32, 20(SP), @START_INDEX-       ;
                              2C BE40          005A3                 [TEXT_BUF]                                 ;
 14   AE  34 AE         6E             00   2C 005A6         MOVC5   #0, (SP), 52(SP), 20(SP), @START_INDEX-    ;
                              2C BE47          005AD                 [ATTR_BUF]                                 ;
                                       5B   D5 005B0         TSTL    CHAR_BUF                                   ;
                                       0E   13 005B2         BEQL    54$                                        ;
             57    0C   AE             30   C1 005B4         ADDL3   #48, DCB, R7                               ;
 14   AE     67         6E             00   2C 005B9         MOVC5   #0, (SP), (R7), 20(SP), @START_INDEX-      ;
                              2C BE4B          005BF                 [CHAR_BUF]                                 ;
             50    0C   AE 0000004C    8F   C1 005C2 54$:    ADDL3   #76, DCB, R0                               ;
                              00 B04A       94 005CB         CLRB    @0(R0)[ROW]                                ;
             95         5A             58   F3 005CF 55$:    AOBLEQ  BLROW, ROW, 53$                            ; 0975
                        56       30    AE   D0 005D3         MOVL    48(SP), POS                                ; 0982
                        58       24    AE   C2 005D7         SUBL2   36(SP), R8                                 ; 0983
                        59       01    A8   9E 005DB         MOVAB   1(R8), LENGTH                              ;
                        51       04    AE   D0 005DF         MOVL    ATTR_BUF, R1                               ; 0985
             1F       6641             06   E1 005E3         BBC     #6, (POS)[R1], 56$                         ;
                        50       08    AE   D0 005E8         MOVL    TEXT_BUF, R0                               ;
                      6640             08   88 005EC         BISB2   #8, (POS)[R0]                              ;
                        52       04    AE   D0 005F0         MOVL    ATTR_BUF, R2                               ;
                        50           6642   9A 005F4         MOVZBL  (POS)[R2], R0                              ;
                        50             0F   CA 005F8         BICL2   #15, R0                                    ;
                        53       04    AE   D0 005FB         MOVL    ATTR_BUF, R3                               ;
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                6643            50      18   AE  89 005FF          BISB3   REND_CODE, R0, (POS)[R3]                        ;
                                        13   11  00605          BRB     57$                                             ;
                                50      08   AE  D0 00607 56$:    MOVL    TEXT_BUF, R0                                    ;
                              6640              08  90 0060B          MOVB    #8, (POS)[R0]                                   ;
                                50      04   AE  D0 0060F          MOVL    ATTR_BUF, R0                                    ;
                6640    18      AE      40   8F  89 00613          BISB3   #64, REND_CODE, (POS)[R0]                       ;
                                56      14   AE  C0 0061A 57$:    ADDL2   20(SP), POS                                     ; 0986
                                51              01  D0 0061E          MOVL    #1, ROW                                         ; 0988
                                                3F  11 00621          BRB     61$                                             ;
                                52      04   AE  D0 00623 58$:    MOVL    ATTR_BUF, R2                                    ; 0990
                  1F              6642              06  E1 00627          BBC     #6, (POS)[R2], 59$                              ;
                                50      08   AE  D0 0062C          MOVL    TEXT_BUF, R0                                    ;
                              6640              0A  88 00630          BISB2   #10, (POS)[R0]                                  ;
                                53      04   AE  D0 00634          MOVL    ATTR_BUF, R3                                    ;
                                50            6643  9A 00638          MOVZBL  (POS)[R3], R0                                   ;
                                50              0F  CA 0063C          BICL2   #15, R0                                         ;
                                54      04   AE  D0 0063F          MOVL    ATTR_BUF, R4                                    ;
                6644            50      18   AE  89 00643          BISB3   REND_CODE, R0, (POS)[R4]                        ;
                                        13   11  00649          BRB     60$                                             ;
                                50      08   AE  D0 0064B 59$:    MOVL    TEXT_BUF, R0                                    ;
                              6640              0A  90 0064F          MOVB    #10, (POS)[R0]                                  ;
                                50      04   AE  D0 00653          MOVL    ATTR_BUF, R0                                    ;
                6640    18      AE      40   8F  89 00657          BISB3   #64, REND_CODE, (POS)[R0]                       ;
                                56      14   AE  C0 0065E 60$:    ADDL2   20(SP), POS                                     ; 0991
                  BD              51              59  F2 00662 61$:    AOBLSS  LENGTH, ROW, 58$                                ; 0988
                                51      04   AE  D0 00666          MOVL    ATTR_BUF, R1                                    ; 0994
                  1F            6641              06  E1 0066A          BBC     #6, (POS)[R1], 62$                              ;
                                50      08   AE  D0 0066F          MOVL    TEXT_BUF, R0                                    ;
                              6640              02  88 00673          BISB2   #2, (POS)[R0]                                   ;
                                52      04   AE  D0 00677          MOVL    ATTR_BUF, R2                                    ;
                                50            6642  9A 0067B          MOVZBL  (POS)[R2], R0                                   ;
                                50              0F  CA 0067F          BICL2   #15, R0                                         ;
                                53      04   AE  D0 00682          MOVL    ATTR_BUF, R3                                    ;
                6643            50      18   AE  89 00686          BISB3   REND_CODE, R0, (POS)[R3]                        ;
                                        13   11  0068C          BRB     63$                                             ;
                                50      08   AE  D0 0068E 62$:    MOVL    TEXT_BUF, R0                                    ;
                              6640              02  90 00692          MOVB    #2, (POS)[R0]                                   ;
                                50      04   AE  D0 00696          MOVL    ATTR_BUF, R0                                    ;
                6640    18      AE      40   8F  89 0069A          BISB3   #64, REND_CODE, (POS)[R0]                       ;
                                24      AE  DD 006A1 63$:    PUSHL   36(SP)                                          ; 1005
                                              7E  D4 006A4          CLRL    -(SP)                                           ; 1003
                                14      AE  DD 006A6          PUSHL   DCB                                             ;
                    00000000G   00              03  FB 006A9          CALLS   #3, SMG$$CHECK_FOR_OUTPUT_DCB                   ;
                                                    04 006B0          RET                                             ; 1008

; Routine Size:  1713 bytes,    Routine Base:  _SMG$CODE + 030A

;  751          1009  1 !<BLF/PAGE>
```

```
;  753          1010  1 END                                   ! End of module SMG$DISPLAY_DRAW
;  754          1011  1
;  755          1012  0 ELUDOM



;                                      PSECT SUMMARY
;
;       Name                        Bytes                        Attributes
;
;  _SMG$CODE                            2491  NOVEC,NOWRT,  RD ,  EXE,  SHR,  LCL,  REL,  CON,  PIC,ALIGN(2)



;                              Library Statistics
;
;                                           -------- Symbols --------       Pages       Processing
;       File                                Total     Loaded   Percent      Mapped      Time
;
;  _$255$DUA28:[SYSLIB]STARLET.L32;1          9776          6         0        581        00:00.9
;  _$255$DUA28:[SMGRTL.OBJ]RTLLIB.L32;1         36          0         0          8        00:00.1
;  _$255$DUA28:[SMGRTL.OBJ]SMGLIB.L32;1        469         26         5         38        00:00.4



;                                       COMMAND QUALIFIERS
;
;       BLISS/CHECK=(FIELD,INITIAL,OPTIMIZE)/NOTRACE/LIS=LIS$:SMGDISDRW/OBJ=OBJ$:SMGDISDRW MSRC$:SMGDISDRW/UPDATE=(ENH$:SMGDISDRW
;       )
;
; Size:          2491 code + 0 data bytes
; Run Time:         00:47.0
; Elapsed Time:     02:30.3
; Lines/CPU Min:     1292
; Lexemes/CPU-Min: 18845
; Memory Used:  474 pages
; Compilation Complete
```

SMGDISDRW
LIS

SMGDISLIN
LIS

SMGDISINP
LIS

SMGDISDHW
LIS